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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/782,042	02/14/2001	Akira Yamaguchi	Q62085	8214

7590 01/13/2004

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EXAMINER	
TON, MINH TOAN T	
ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 01/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/782,042	YAMAGUCHI, AKIRA	
	Examin r	Art Unit	
	HOAN C. NGUYEN	2871	

-- The MAILING DATE of this communication appears on the cover she t with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) *12-23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6 and 8-11* is/are rejected.

7)☒ Claim(s) *7* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant must provide a proof of the formula in claim 1 based on the boundary condition of Fig. 3.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 3-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishihara (US5946100A).

In regard to claim 1, Ishihara teaches (Figs. 6-7) a light diffusing plate comprising:

- a lens substrate;
- a plurality of microlenses disposed on a surface of said lens substrate;

- a plurality of light entrance areas (pinhole of Figs. 6-7), each having a circular form a center of which is coincident with an optical axis of each of said plurality of microlenses; and set on another surface of lens substrate reverse to the plurality of microlens;
- a light shield layer
    - formed on another surface of the lens substrate reverse to said plurality of microlenses as so to cover other area than said plurality of light entrance areas,

wherein

- when a refractive index of said lens substrate is represented by n; a thickness of said lens substrate by t; a diameter of each of said plurality of light exit areas by R; and a size of each of said plurality of microlenses by Sr, the following formula is satisfied (see attachment for deriving the formula using principle of the geometric optics):

    $Sr \geq .2t \bullet \tan\Theta . + R$ (with the proviso that $\Theta = \sin^{-1}(1/n)$.

- said plurality of microlenses are arranged in a closest packing state or in hexagonal form when viewed from the direction of the optical axis and are arranged in a hexagonal close-packed state, see Fig. 7 (claim 3).
- microlenses made of glass, therefore the refractive index of said lens substrate is between 1.4 and 2 (claim 4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishihara (US5946100A) as applied to claims 1, and 3-4 above.

The use of diffusing-reflecting mean is known and common in the art for achieving advantages such as high efficiency of light.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a diffusing-reflecting layer, as it is common and known in the art for achieving advantages such as light uniformity.

3. Claims 5-6 and 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable Applicant's Prior Disclosed Art (APA) hereinafter, background of invention in view of Ishihara (US5946100A) as applied to claims 1-4 above.

APA discloses that the use of a liquid crystal display device yields several advantages such as size reduction, small thickness, light weight. APA discloses a conventional liquid crystal display device employing the use of a conventional collimating plate, wherein there are several problems (e.g., low efficiency of light) of the conventional collimating plate (paragraphs 2, 3, 9, 55-56).

However, APA does not disclose a collimating plate and plurality of light source as disclosed in Figs.5-6, 9 and 11.

In regard to claims 5-6, 9 and 11, shihara discloses a collimating plate comprising: a lens (glass) substrate; a plurality of micro lenses disposed on a surface of the lens substrate; a plurality of light entrance areas (see `pinholes' of Figures 6-7) each having a circular form a center of which is on an optical axis of each of the plurality of micro lenses and set on another surface of the lens substrate reverse to the plurality of micro lenses; and light shield films formed on another surface of said lens substrate reverse to the plurality of micro lenses so as to cover other area than the plurality of light entrance areas, wherein when a refractive index of the lens substrate is represented by n; a thickness of the lens substrate by t; a diameter of each of the plurality of light entrance areas by R; and a size of each of the plurality of micro lenses by Sr, the following formula : $Sr>-2t \times \tan\Theta+R$ (with the proviso that $\Theta= \sin^{-1}(l/n)$) is satisfied) [see attached sheet for this derived formula]. ishihara discloses that such collimating plate yields advantages such as improved array confocal imaging.

Therefore, it would have been obvious to one of ordinary skill in the art to employ the collimating plate as disclosed/taught by Ishihara for achieving advantages such as improved array confocal imaging.

In regard to claims 6-8 and 11, the use of a plurality of light sources is known in the art for achieving advantages such as light uniformity, and commonly-used in the

projecting type display device, wherein light sources such as LEDs, organic EL elements are common and known light-source elements.

Therefore, it would have been obvious to one of ordinary skill in the art to employ a plurality light sources for achieving advantages such as light uniformity, as it is known and commonly used in the projecting type display device.

Allowable Subject Matter

Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record does not anticipate nor render obvious to one ordinary skilled in the art a lighting device comprising a combination of various elements as claimed, more specifically, wherein a light emission size of each of the plurality of light sources is smaller than a size of each of the plurality of light entrance areas.

Response to Arguments

Applicant's arguments filed on 10/23/ 2003 have been fully considered but they are not persuasive.

Applicant's ONLY arguments are follows:

A. The direction of the inequality sign of formula in claim 1 is reversed, therefore Examiner 's logic contradicts the logic the present invention.

B. claim 2 requires a diffuse reflecting layer that covers "other area than said plurality of light entrance areas."

Examiner's responses to Applicants' ONLY arguments are follows:

A In part one, examiner tries to modify Fig. 6 with the boundary/initial conditions in Fig. 3. The angle $\Theta_{min} = \sin^{-1}(1/n)$ as shown in attachment (*the proof also provided in Final Action of Application Number 09782199 with the light ray reverses for collimating light*) for which if angle $\Theta > \Theta_{min}$ light will go through another lens and collimates, and if $\Theta < \Theta_{min}$ light will go through lens facing an opening of pin hole. If applicant uses different boundary/initial conditions for proof this formula, applicant should clarify these in specification.

In part two, examiner based on the boundary/initial with the angle $\Theta_{min} = \sin^{-1}(1/n)$ he get

$$Sr - R = 2t \tan\Theta_{min};$$

If angle $\Theta > \Theta_{min}$ so that light will go through another lens and is collimated

$$Sr - R \geq 2t \tan\Theta;$$

therefore,

$$Sr\ R \geq 2t \tan\Theta + R.$$

If there is another way for proof this formula, please provide the proof.

B The use of diffusing-reflecting mean is known and common in the art for achieving advantages such as high light efficiency or light uniformity. Applicant in specification (paragraph 56) also disclosed this conventional art.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HOAN C. NGUYEN whose telephone number is (703) 306-0472. The examiner can normally be reached on MONDAY-THURSDAY:8:00AM-4:30PM.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.

HOAN C. NGUYEN
Examiner
Art Unit 2871

ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

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January 9, 2004